

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-312085

(43)Date of publication of application : 06.11.2003

(51)Int.Cl.

B41J 29/00

B29C 65/02

B41J 2/01

(21)Application number : 2002-116876

(71)Applicant : CANON INC

(22)Date of filing : 18.04.2002

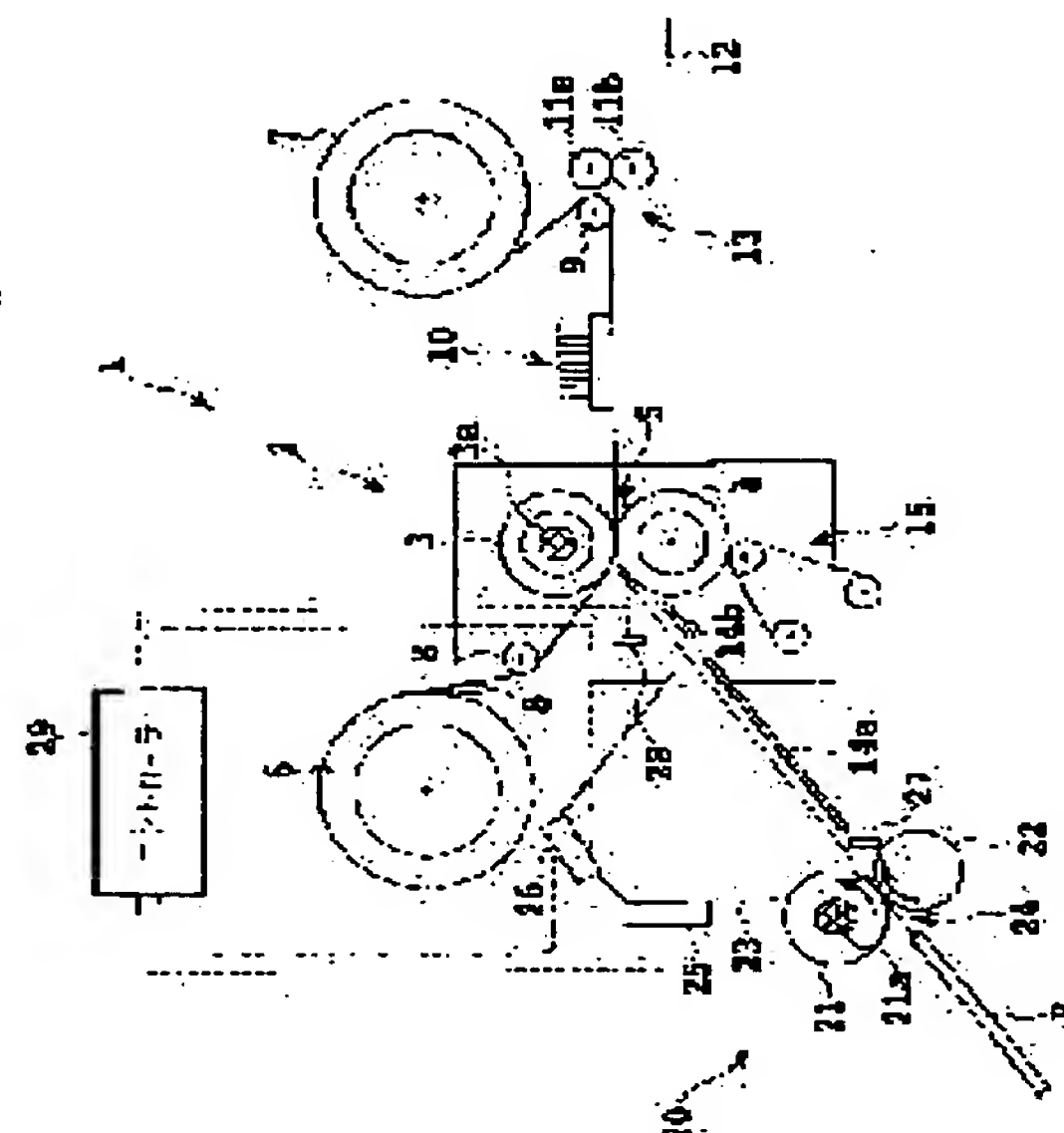
(72)Inventor : ADACHI EIICHI

## (54) LAMINATOR, PRINTER AND METHOD FOR LAMINATING PRINTED RECORDING MEDIUM

## (57)Abstract:

PROBLEM TO BE SOLVED: To laminate a printed recording medium surely at a high speed and to sustain high quality of an image.

SOLUTION: The drying section 20 of a laminator 1 is disposed on the upstream side of a laminate section 2. The drying section 20 comprises a roller 21 for drying the printed recording medium P by heating one side thereof, a roller 22 for pressing the printed recording medium P against the heating roller 21, an exhaust fan 25 for removing steam generated from the printed recording medium P, a suction fan 26 for introducing low humidity gas to the print surface of the printed recording medium P heated by means of the heating roller 21, and a controller 29 for controlling the operation of the exhaust fan 25 and the suction fan 26 depending on presence of the printed recording medium P between the heating roller 21 and the laminate section 2.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application  
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of  
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[Date of requesting appeal against examiner's decision  
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[Date of extinction of right]

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The lamination section which is the laminator which performs lamination processing to the printed record medium with which the predetermined image was printed, and forms a lamination layer in the print side of said printed record medium, It has the dryer part which dries said printed record medium by the upstream of said lamination section. Said dryer part A heating means for it to be arranged at the upstream of said lamination section, and to heat one field of said printed record medium, A pressurization means to press said printed record medium to said heating means, An exhaust air means to remove the steam emitted from said printed record medium, An air-supply means to introduce a damp gas to the print side of said printed record medium heated by said heating means, The laminator characterized by including the control means which controls actuation of said exhaust air means and said air-supply means according to existence of said printed record medium between said heating means and said lamination sections.

[Claim 2] Said control means is a laminator according to claim 1 characterized by operating said exhaust air means when said printed record medium does not exist between said heating means and said lamination sections, and operating said exhaust air means and said air-supply means when said printed record medium exists between said heating means and said lamination sections.

[Claim 3] It is the laminator according to claim 1 or 2 which is further equipped with the duct arranged between said heating means and said lamination sections, and said exhaust air means is the ventilating fan which can be discharged outside about the gas in said duct, and is characterized by said air-supply means being the inhalation-of-air fan who can introduce the open air in said duct.

[Claim 4] It can reverse so that the gas in said duct may be discharged outside, while said inhalation-of-air fan can rotate normally so that the open air may be introduced in said duct. Said control means When said printed record medium does not exist between said heating means and said lamination sections While operating said ventilating fan, inversion actuation of said inhalation-of-air fan is carried out. The laminator according to claim 3 characterized by carrying out normal rotation actuation of said inhalation-of-air fan while operating said exhaust air means when said printed record medium exists between said heating means and said lamination sections.

[Claim 5] It is a laminator given in any 1 term of claims 1-4 characterized by for said heating means being a heating roller which has a heating unit, and said pressurization means being a pressurization roller which presses said printed record medium to said heating roller.

[Claim 6] It is a laminator given in any 1 term of claims 1-4 which said heating means is a heating plate which has a flat heating surface, and are characterized by said pressurization means being a pressurization roller which presses said printed record medium to said heating surface of said heating plate.

[Claim 7] The ink jet print section which is the printing equipment which can be formed in a record medium about a predetermined image, and forms an image in said record medium, The lamination section which forms a lamination layer in the print side of the printed record medium with which the predetermined image was printed by said ink jet print section, It is arranged between said ink jet print sections and said lamination sections. It has the dryer part which dries said printed record medium sent to said lamination section from said ink jet print section. Said dryer part A heating means for it to be arranged at the upstream of said lamination section, and to heat one field of said printed record medium, A pressurization means to press said printed record medium to said heating means, An exhaust air means to remove the steam emitted from said printed record medium, An air-supply means to introduce a damp gas to the print side of said printed record medium heated by said heating means, The printing equipment characterized by including the control means which controls actuation of said exhaust air means and said air-supply means according to existence of said printed record medium between said

heating means and said lamination sections.

[Claim 8] It is the lamination approach of a printed record medium of performing lamination processing to the printed record medium with which the predetermined image was printed using the lamination section. While arranging a heating means to heat one field of said printed record medium to the upstream of said lamination section An exhaust air means to remove the steam emitted from said printed record medium, An air-supply means to introduce a damp gas to the print side of said printed record medium heated by said heating means is established. When said printed record medium does not exist between said heating means and said lamination devices The lamination approach of a printed record medium characterized by operating said exhaust air means and said air-supply means when said exhaust air means is operated and said printed record medium exists between said heating means and said lamination devices.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the technique of performing lamination processing to the printed record medium with which the predetermined image was printed especially, about the lamination approach of a laminator, a printing equipment, and a printed record medium.

**[0002]**

**[Description of the Prior Art]** Small and since it has comparatively easy structure while it is cheap, the ink jet printer is broadly used in various fields from the former. Usually, this kind of ink jet printer is only what only carries out the regurgitation of the ink droplet to the front face of record media, such as paper. Therefore, the image of a record medium [ finishing / a print ] might be originated, confused or faded by existence of moisture etc. by ultraviolet rays after the print. At this point, indication that the printed record medium obtained with an ink jet printer seldom fits prolonged preservation is made from the former. Moreover, indication that the printed record medium obtained with an ink jet printer is inferior a little in respect of smooth nature, or glossiness and lightfastness to a film photo is also made seen from the field of image quality.

**[0003]** In view of such indication, the laminator which performs lamination processing to a printed record medium is put in practical use that an improvement of a mothball and image quality should be made possible. This kind of laminator has the fixing roller which has a heating means, and heats the adhesion material applied to the resin film or the resin film by the fixing roller. And if the resin film or adhesion material which carried out melting with the fixing roller hardens on a printed record medium, the lamination layer which protects an image will be formed on the print side of a printed record medium. However, the print side of a printed record medium contains the moisture contained in ink in large quantities immediately after completing the print by the ink jet printer. For this reason, if above-mentioned lamination processing is performed before such moisture dries, fault like following (1) - (3) will be produced.

**[0004]** (1) Since a printed record medium is also heated by coincidence when heating temperature fall above-mentioned the resin film and adhesion material of a fixing roller with a fixing roller, in this case, the moisture contained in the record medium will evaporate and the heating value which a fixing roller emits as that heat of vaporization will be lost. Consequently, heating values (temperature) required for heating of a resin film or adhesion material will run short, and it will be difficult to fix a lamination layer to a printed record medium firmly.

**[0005]** (2) Since the specific heat of the moisture contained in the increment ink in the specific heat of a printed record medium is larger than the specific heat of the record medium itself, the specific heat of the record medium (it was devoted) with which ink was breathed out in large quantities becomes large. It may become difficult for heating values (temperature) required for heating of a resin film or adhesion material to run short, and to fix a lamination layer to a printed record medium firmly also by such increment in the specific heat of a printed record medium.

**[0006]** (3) generating of a steam -- if a printed record medium is heated as mentioned above in case a lamination layer is formed, the moisture contained in the record medium will evaporate and a steam will be generated. In this condition, if the print side of a record medium is covered by laminate materials, such as a resin film, the steam which lost the place to go to will be confined between a record medium and a laminate material. In this case, since the steam between a record medium and a laminate material bars adhesion with a record medium and a laminate material, it will be difficult [ it / to fix a lamination layer to a printed record medium firmly ].

**[0007]** The above (1) The problem of - (3) may be similarly produced, when performing lamination processing to



the printed record medium printed by other approaches under the environment of not only the printed record medium obtained with the ink jet printer but heat and high humidity. Then, including a dryer part in the lamination equipment for laminating the printed record medium containing a lot of moisture so that it may be located in the upstream of the lamination section is proposed. In this case, after being compulsorily dried so that the moisture contained in it may evaporate, lamination processing of the printed record medium is carried out.

[0008]

[Problem(s) to be Solved by the Invention] On the other hand, in recent years, the following problems will arise by drying a printed record medium to the inside of a short time, when performing lamination processing at high speed, although much more high-speed processing is called for also from above-mentioned lamination processing.

[0009] That is, when a printed record medium is dried to the inside of a short time, a steam will be rapidly generated from a printed record medium. In this case, dew condensation occurs in the transit route of a record medium, and when moisture adheres to a printed record medium, there is a possibility that final image grace may be spoiled. Therefore, in order that a steam may prevent being confined between a record medium and a laminate material, it will be necessary to remove a lot of steams emitted from a printed record medium in the inside of a short time. However, if it is going to leave certainly a lot of steams emitted from a printed record medium, it will be necessary to enlarge distance between a dryer part and the lamination section to some extent, and, now, as for high-speed lamination processing, miniaturization of \*\* and the whole equipment will also be spoiled.

[0010] Moreover, in order to dry a printed record medium for a short time, it is necessary to heat a printed record medium rapidly. However, since such rapid heat-treatment gives the heat beyond the need to the printed record medium which passed the dryer part, at the time of lamination processing, a laminate material will be in overheating and a poor lamination will be caused on the contrary. Furthermore, if a dryer part includes a heating means to generate high temperature so that it may dry a printed record medium to the inside of a short time, the circumference of a dryer part will also become an elevated temperature superfluously. In this case, it will be necessary to insulate a dryer part certainly from a peripheral device, or to cool the circumference of a dryer part.

[0011] Then, this invention aims at offer of the lamination approach of the laminator which carries out lamination processing certainly and makes it possible a high speed and to maintain an image at high definition to a printed record medium, a printing equipment, and a printed record medium.

[0012]

[Means for Solving the Problem] One gestalt of this invention starts the laminator which performs lamination processing to the printed record medium with which the predetermined image was printed. This laminator is equipped with the lamination section which forms a lamination layer in the print side of a printed record medium, and the dryer part which dries a printed record medium by the upstream of the lamination section. And a heating means for the dryer part to be arranged at the upstream of the lamination section, and to heat one field of a printed record medium, A pressurization means to press a printed record medium to a heating means, and an exhaust air means to remove the steam emitted from a printed record medium, An air-supply means to introduce a damp gas to the print side of the printed record medium heated by the heating means, and the control means which controls actuation of an exhaust air means and an air-supply means according to existence of the printed record medium between a heating means and the lamination section are included.

[0013] And preferably, a control means operates an exhaust air means, when a printed record medium does not exist between a heating means and the lamination section, and when a printed record medium exists between a heating means and the lamination section, it operates an exhaust air means and an air-supply means.

[0014] Thus, since a dryer part and the hot (and highly humid) air of the circumference of it are removed by operating an exhaust air means when a printed record medium does not exist between a heating means and the lamination section, a dryer part is maintained at the proper temperature which does not have a bad influence on lamination processing of the printed record medium in the latter lamination section. Therefore, necessary minimum is sufficient for heat insulation with a dryer part and a peripheral device, and cooling of the dryer-part circumference.

[0015] Furthermore, in the laminator by this invention, when a printed record medium exists between a heating means and the lamination section, the both sides of an exhaust air means and an air-supply means operate. Thereby, the steam emitted from a printed record medium is removed by the exhaust air means. Moreover, a damp gas will be introduced to the print side of a printed record medium by the air-supply means. Therefore,

while a printed record medium exists between a heating means and the lamination section, and overheating of a printed record medium is prevented, the humidity of the printed record-medium circumference falls. Consequently, a printed record medium and its circumference are maintained at proper temperature, and generating of dew condensation is prevented certainly.

[0016] Thus, according to the laminator by this invention, a printed record medium is maintained at the temperature and humidity suitable for lamination processing while being efficiently dried by the dryer part to the inside of a short time. Therefore, the distance between a heating means and the lamination section can be shortened, and high-speed lamination processing can be realized, and the whole equipment can be miniaturized. Moreover, since overheating of a printed record medium and the laminate material accompanying it is also prevented, in the lamination section, a lamination layer can be certainly fixed to a printed record medium. And as mentioned above, since generating of the dew condensation in a dryer part is prevented, deterioration of the poor lamination resulting from moisture adhering to a printed record medium and image grace can be prevented effectively.

[0017] Moreover, the lamination section is further equipped with the duct arranged between a heating means and the lamination section, and an exhaust air means is the ventilating fan which can be discharged outside about the gas in a duct, and is desirable in his being the inhalation-of-air fan who can introduce the open air in a duct. [ of an air-supply means ]

[0018] Furthermore, as the gas in a duct is discharged outside, it may be an inhalation-of-air fan in whom inversion actuation is possible, while normal rotation actuation is possible for an air-supply means so that the open air may be introduced in a duct. In this case, when inversion actuation of the inhalation-of-air fan is carried out, a printed record medium exists between a heating means and the lamination section, and a control means carries out normal rotation actuation of the inhalation-of-air fan while operating an exhaust air means, it is [ be / when / a printed record medium does not exist between a heating means and the lamination section, be / while / operating a ventilating fan, ] desirable.

[0019] Thus, it becomes possible to remove efficiently the surrounding elevated-temperature (and highly humid) air of a heating means or a printed record medium certainly by using the inhalation-of-air fan who may function also as a ventilating fan. Therefore, a dryer part can always be maintained at the temperature and humidity suitable for lamination processing of a printed record medium. Moreover, heat insulation with a dryer part and a peripheral device and the need for cooling of the dryer-part circumference can be reduced further.

[0020] Furthermore, a heating means is a heating roller which has a heating unit, and a pressurization means is desirable in it being the pressurization roller which presses a printed record medium to a heating roller.

[0021] Moreover, a heating means is a heating plate which has a flat heating surface, and a pressurization means is desirable in it being the pressurization roller which presses a printed record medium to the heating surface of a heating plate.

[0022] Other gestalten of this invention start the printing equipment which can be formed in a record medium in a predetermined image. This printing equipment is arranged between the ink jet print section which forms an image in a record medium, the lamination section which forms a lamination layer in the print side of the printed record medium with which the predetermined image was printed by the ink jet print section, and the ink jet print section and the lamination section, and is equipped with the dryer part which dries the printed record medium sent to the lamination section from the ink jet print section. And a heating means for the dryer part to be arranged at the upstream of the lamination section, and to heat one field of a printed record medium, A pressurization means to press a printed record medium to a heating means, and an exhaust air means to remove the steam emitted from a printed record medium, An air-supply means to introduce a damp gas to the print side of the printed record medium heated by the heating means, and the control means which controls actuation of an exhaust air means and an air-supply means according to existence of the printed record medium between a heating means and the lamination section are included.

[0023] While a series of activities of the image formation to a record medium, desiccation of a printed record medium, and the lamination processing to a printed record medium may be done in the inside of a short time according to the printing equipment by such this invention, the printed record medium suitable for the mothball which has a high-definition image can be obtained easily and certainly.

[0024] The gestalt of further others of this invention is the lamination approach of a printed record medium of performing lamination processing to the printed record medium with which the predetermined image was printed using the lamination section. While arranging a heating means to heat one field of a printed record medium to the upstream of the lamination section An exhaust air means to remove the steam emitted from a printed record



medium, and an air-supply means to introduce a damp gas to the print side of the printed record medium heated by the heating means are established. It is characterized by operating an exhaust air means, when a printed record medium does not exist between a heating means and the lamination section, and operating an exhaust air means and an air-supply means, when a printed record medium exists between a heating means and the lamination section.

[0025]

[Embodiment of the Invention] Hereafter, the suitable operation gestalt of this invention is explained to a detail, referring to an accompanying drawing.

[0026] Drawing 1 is the outline block diagram showing 1 operation gestalt of the laminator by this invention. The laminator 1 shown in this drawing has the lamination section (fixing section) 2 which forms the lamination layer L in the print side (field in which the image was formed) of the printed record medium P in which the image was formed by image formation equipments, such as other ink jet printers. The lamination section 2 contains the heating roller 3 for fixing, and the pressurization roller 4 for fixing. The heating roller 3 for fixing is formed in midair, and fixing heater 3a is held in the interior. Moreover, surface treatment is performed to the heating roller 3 for fixing with the material of a silicon system or a fluorine system. On the other hand, the pressurization roller 4 for fixing has the front face which consists of a material of a silicon system etc., and the periphery is equipped with the tube which consists of a material of a fluorine system. The heating roller 3 for fixing and the pressurization roller 4 for fixing form the fixing nip 5 between which it counters for each other and the printed record medium P and the imprint sheet S are put.

[0027] Moreover, as shown in drawing 1 and drawing 2, the lamination section 2 contains the delivery roller 6 and the rolling-up roller 7 which counters on both sides of the delivery roller 6 arranged in the side of the heating roller 3 for fixing, and the pressurization roller 4 for fixing, and the heating roller 3 for fixing and the pressurization roller 4 for fixing. The imprint sheet S is wound around the delivery roller 6. The imprint sheet S produces the surface S3 which consists of an adhesive layer S2, transparent resin, etc. on the base material S1, as shown in drawing 3. It lets out the imprint sheet S from the delivery roller 6, and the fixing nip 5 lets it pass through a guide idler 8. And the rolling-up roller 7 rolls round only the base material S1 of the imprint sheet S through a guide idler 9.

[0028] Furthermore, between the heating roller 3 for fixing and the pressurization roller 4 for fixing, and the guide idler 9, it is arranged so that a refrigeration unit (cooling section) 10 may be located above the imprint sheet S. And the delivery rollers 11a and 11b and a paper output tray 12 are arranged in order at the downstream of a guide idler 9.

[0029] If the printed record medium P is sent from an ink jet printer etc. to the above-mentioned lamination section 2, showing around with the medium guides 14a and 14b, the tip of the printed record medium P will contact the adhesive layer S2 of the imprint sheet S first. Printed record medium P which contacted the imprint sheet S It is inserted in the fixing nip 5 with the imprint sheet S. Thus, by making the printed record medium P contact the imprint sheet S first, the tip of a record medium P bends and being pressurized and heated in the condition of having been folded up as it is is prevented.

[0030] In the fixing nip 5, the pressure welding of the printed record medium P and the imprint sheet S of each other is carried out with the heating roller 3 for fixing, and the pressurization roller 4 for fixing. It can come, simultaneously it is heated by fixing heater 3a of the heating roller 3 for fixing, and thereby, the adhesive layer S2 and surface S3 of the imprint sheet S fuse the printed record medium P and the imprint sheet S, and they are united with the printed record medium P. The printed record medium P, the adhesion material S2, and surface S3 which were unified by the fixing nip 5 are cooled with a refrigeration unit 10 before a guide idler 9, thereby, an adhesive layer S2 and a surface S3 harden, and a surface S3 is fixed to the printed record medium P.

[0031] And in the separation section 13 which consists of a guide idler 9 and delivery rollers 11a and 11b, if the base material S1 is removed from the printed record medium P, coating of the print side of the printed record medium P will be carried out by the lamination layer L. The laminated printed record medium P passes the delivery rollers 11a and 11b, and is sent to a paper output tray 12. This has good smooth nature and good glossiness, and the printed record medium P which is excellent in endurance can be obtained.

[0032] In addition, the rotation drive of the above-mentioned delivery roller 6 is carried out by the drive which is not illustrated in the direction (the direction of an arrow head of drawing 2) which lets out an imprint sheet. Moreover, the delivery roller 6 is constituted so that rotation regulation may be added with predetermined torque to the direction which rolls round the imprint sheet S. On the other hand, the rotation drive of the above-

mentioned rolling-up roller 7 is carried out by the drive which is not illustrated in the direction (the direction of an arrow head of drawing 2 ) which rolls round the base material S1 of the imprint sheet S. Moreover, the rolling-up roller 7 is constituted so that rotation regulation may be added with predetermined torque to the direction which rewinds the base material S1.

[0033] Thereby, since tension will be applied in the direction of the both sides of rolling up and rewinding, generating of Siwa of the imprint sheet S is prevented by the imprint sheet S (base material S1). Moreover, as the width of face of the imprint sheet S is shown in drawing 2 , even if it is slightly enlarged rather than the width of face of the printed record medium P and the crosswise location of the imprint sheet S and a record medium P is shifted somewhat by this, the whole print side of a record medium P is covered with the imprint sheet S.

[0034] Here, since the width of face of the imprint sheet S is larger than the width of face of the printed record medium P in the case of an above-mentioned fixing process (lamination processing), a part of adhesive layer S2 of the imprint sheet S also contacts the front face of the pressurization roller 4 for fixing. Furthermore, if it takes into consideration preventing the lap of the continuous printed record medium P even if the printed record medium P is continuously sent to the fixing nip 5, spacing of record-medium P cannot be made into zero. Therefore, the part of the adhesive layer S2 which corresponds among record-medium P by which continuation supply is carried out also contacts the front face of the pressurization roller 4 for fixing.

[0035] On the other hand, as mentioned above, it is covered by the tube which consists of a material of a fluorine system, and a foreign matter cannot adhere easily, and although the pressurization roller 4 for fixing has the surface characteristic which is easy to remove the adhering foreign matter, it is difficult to, prevent completely adhesion of foreign matters, such as a part of adhesive layer S2, for example. Thus, when the foreign matter has adhered to the front face of the pressurization roller 4 for fixing, a foreign matter mixes in the adhesive layer S2 of the imprint sheet S with rotation of the pressurization roller 4 for fixing, finally it remains on the front face of the printed record medium P, and there is a possibility that image grace may be spoiled. For this reason, the laminator 1 of this operation gestalt is equipped with the cleaning device 15 for removing a foreign matter from the front face of the pressurization roller 4 for fixing.

[0036] As shown in drawing 4 , the cleaning device 15 contains the delivery roller 152 which lets out a nonwoven fabric 151 and a nonwoven fabric 151, the rolling-up roller 153 which rolls round a nonwoven fabric 151, and the press roller 154 which presses a nonwoven fabric 151 against the pressurization roller 4 for fixing. The press roller 154 is a product made of foamed rubber, it is energized to the pressurization roller 4 for fixing by the pressurization device which is not illustrated, and, thereby, a nonwoven fabric 151 contacts the front face of the pressurization roller 4 for fixing. Rotation of the pressurization roller 4 for fixing incorporates the foreign matter adhering to the front face between the fibers of a nonwoven fabric 151. Moreover, the rolling-up roller 153 is intermittently rotated for a foreign matter with the drive which is not illustrated in the phase which carried out considerable-amount adhesion by the part which is in contact with the front face of the pressurization roller 4 for fixing of a nonwoven fabric 151. The front face of the pressurization roller 4 for fixing is always maintained at the condition that there is no adhesion of a foreign matter by such cleaning device 15. Moreover, the field which has not incorporated the foreign matter of a nonwoven fabric 151 is made to contact the front face of the pressurization roller 4 for fixing to suitable timing.

[0037] Now, in the lamination section 2 which was mentioned above, when forming the lamination layer L in the print side of the printed record medium P, it is important to fully dry the printed record medium P in advance of lamination processing. Moreover, in order to shorten implementation of high-speed lamination processing, i.e., the time amount to completion of lamination processing from the completion of a print, while fully drying the printed record medium P to the inside of a short time, it is necessary to remove certainly a lot of steams generated at the time of desiccation.

[0038] For this reason, the laminator 1 is equipped with the dryer part 20 explained below. As shown in drawing 1 , this dryer part 20 is formed in the upstream of the lamination section 2 (the heating roller 3 for fixing, and pressurization roller 4 for fixing), and contains the heating roller 21 for desiccation (heating means), the pressurization roller 22 for desiccation (pressurization means), and the duct 23.

[0039] The heating roller 21 for desiccation is arranged before medium guide 14a of the upstream, and with the drive which is not illustrated, a rotation drive is carried out so that the printed record medium P may be sent to the lamination section 2 of the downstream. Moreover, the heating roller 21 for desiccation is formed in midair, and heating heater 21a for desiccation by which a temperature control is carried out with the temperature controller which is not illustrated is held in the interior. The skin temperature of the heating roller 21 for



desiccation is maintained at an elevated temperature by this heating heater 21a so that even extent required of good lamination processing of the printed record medium P can be dried.

[0040] On the other hand, the pressurization roller 22 for desiccation is arranged free [ rotation ] so that it may counter with the heating roller 21 for desiccation, and the desiccation nip 24 is formed among both. Moreover, the pressurization roller 22 for desiccation is energized to the heating roller 21 for desiccation by the press device which is not illustrated. When the printed record medium P does not exist in the desiccation nip 24, the pressurization roller 22 for desiccation contacts the heating roller 21 for desiccation, and may be heated with a roller 21. The pressurization roller 22 for desiccation has the flexible periphery section which consists of foaming sponge etc., in order to enlarge width of face of the desiccation nip 24. And the pressurization roller 22 for desiccation is equipped with the tube which consists of PFA (tetrafluoroethylene-perfluoroalkyl vinyl ether copolymer) which has good mold releasability. Thereby, prevention becomes possible about the ink of the print side of the printed record medium P imprinting on the front face of the pressurization roller 22 for desiccation.

[0041] a duct 23 — between the heating roller 21 for desiccation and the pressurization roller 22 for desiccation, and the heating rollers 3 for fixing and the pressurization rollers 4 for fixing — the imprint sheet S (print side of the printed record medium P) — a wrap — it is arranged like. This duct 23 is equipped with the inhalation-of-air fan (air-supply means) 26 who discharges the gas in the ventilating fan (exhaust air means) 25 which introduces the open air in a duct 23, and a duct 23 to the exterior of a duct 23. With this operation gestalt, the ventilating fan 25 is attached in the side-face upper part of the upstream of a duct 23, and it is attached in the upper part of a duct 23 so that the inhalation-of-air fan 26 may be located in the downstream rather than a ventilating fan 25.

[0042] Furthermore, the tip detection sensor 27, the back end detection sensor 28, and a controller 29 are contained in a dryer part 20. The tip detection sensor 27 is arranged between near the inlet port of a duct 23 (dryer part 20) (i.e., the pressurization roller 22 for desiccation, and medium guide 14a of the upstream), and if the tip of the printed record medium P is detected by non-contact, it sends out a detecting signal to a controller 29. On the other hand, the back end detection sensor 28 is arranged near the outlet of a duct 23 (dryer part 20) (i.e., the upper part of medium guide 14b of the downstream), and if the back end of the printed record medium P is detected by non-contact, it sends out a detecting signal to a controller 29. A controller 29 controls actuation of a ventilating fan 25 and the inhalation-of-air fan 26 according to the signal from the tip detection sensor 27 and the back end detection sensor 28.

[0043] Next, desiccation processing (desiccation process) of the printed record medium P in the above-mentioned dryer part 20 is explained, referring to drawing 5.

[0044] In this case, it is first supplied to the power source of heating heater 21a for desiccation to the suitable timing before the printed record medium P is sent to a laminator 1 from an ink jet printer etc. It can come, simultaneously a controller 29 makes actuation of a ventilating fan 25 start (S10). The superfluous heat emitted in a duct 23 from heating heater 21 for desiccation a is discharged out of a duct 23 by this, and the temperature in a duct 23 is maintained at the proper temperature which does not have a bad influence on lamination processing of the printed record medium P in the latter lamination section 2. Therefore, needlessness or necessary minimum is sufficient for cooling around heat insulation or around [ of a dryer part 20 (duct 23) and a peripheral device / dryer-part 20 ]. Moreover, heating heater 21a for desiccation operates intermittently according to the value of the roller skin temperature detection sensor which is not illustrated from the phase where the skin temperature of the heating roller 21 for desiccation reached the fitness value, and, thereby, the skin temperature of the heating roller 21 for desiccation is maintained at a fitness value (S12).

[0045] In this phase, preparation of the desiccation processing in a dryer part 20 is completed, and the printed record medium P is sent to a laminator 1 (dryer part 20) from an ink jet printer etc. On the other hand, the controller 29 of a dryer part 20 is carrying out the monitor of the existence of the signal from the tip detection sensor 27 of a duct inlet port (S14). And the tip detection sensor 27 of a dryer part 20 is the phase which detected the tip of the printed record medium P, and sends out a detecting signal to a controller 29. A controller 29 makes the inhalation-of-air fan's 26 actuation start, when the detecting signal from a sensor 27 is received (S16).

[0046] The printed record medium P which passed the tip detection sensor 27 is carried forward to the desiccation nip 24 according to the conveyance device which is not illustrated. Moreover, the controller 29 of a dryer part 20 is carrying out the monitor of the existence of the signal from the back end detection sensor 28 of a duct outlet (S18). And the back end detection sensor 28 of a dryer part 20 is the phase which detected the back end of the printed record medium P, and sends out a detecting signal to a controller 29. A controller 29 will

stop the inhalation-of-air fan's 26 actuation, if the detecting signal from a sensor 28 is received (S20). Thus, in the dryer part 20 of a laminator 1, while the printed record medium P of one sheet passes through the inside of a duct 23 (i.e., while the printed record medium P exists between the heating roller 21 for desiccation, and the lamination section 2), the inhalation-of-air fan 26 operates and, thereby, external damp air is introduced in a duct 23. This is based on the following reasons.

[0047] That is, the printed record medium P is pressed with the pressurization roller 22 for desiccation by the heating roller 21 for desiccation, and the print side is rapidly heated with the heating roller 21 (heating heater 21 for desiccation a) for desiccation. Thus, if the printed record medium P is rapidly heated by the desiccation nip 24 and it becomes an elevated temperature, the moisture (moisture in ink) contained in the record medium P will evaporate, and a steam will be generated in large quantities in a duct 23. And a poor lamination will be caused by the steam if the printed record medium P runs in the lamination section 2 as it is.

[0048] On the other hand, in a laminator 1, when the printed record medium P exists in between in [ 2 ] a duct 23 (i.e., the heating roller 21 for desiccation, and the lamination section), the both sides of a ventilating fan 25 and the inhalation-of-air fan 26 operate. Thereby, the steam emitted from the printed record medium P is removed by the ventilating fan 25. Moreover, the damp open air will be introduced by the inhalation-of-air fan 26 to the print side of the printed record medium P. Therefore, while the printed record medium P exists between the heating roller 21 for desiccation, and the lamination section 2, and overheating of the printed record medium P is prevented, the humidity of the printed record-medium P circumference falls. Consequently, the printed record medium P and its circumference are maintained at proper temperature, and generating of dew condensation is prevented certainly.

[0049] As mentioned above, according to the laminator 1 which has a dryer part 20, the printed record medium P is maintained at the temperature and humidity suitable for lamination processing while being efficiently dried by the inside of a short time. Therefore, the distance between the heating roller 21 for desiccation (heating means) and the lamination section 2 can be shortened, and high-speed lamination processing can be realized, and the whole equipment can be miniaturized. Moreover, since overheating of the printed record medium P and overheating of the imprint sheet S accompanying it are also prevented, in the lamination section 2, the lamination layer L can be certainly fixed to the printed record medium P. And as mentioned above, since generating of the dew condensation in a dryer part 20 is prevented, deterioration of the poor lamination resulting from moisture adhering to the printed record medium P and image grace can be prevented effectively.

[0050] If the inhalation-of-air fan 26 is stopped in S20, installation of the open air to a duct 23 will no longer be performed, but since the ventilating fan 25 is still operating, the air in a duct 23 is discharged positively outside, and the temperature and humidity in a duct 23 are kept proper. In addition, when the printed record medium P is continuously conveyed by the laminator 1 (dryer part 20) after the inhalation-of-air fan 26 is stopped by S20, processings from above-mentioned S12 to S20 are repeated. Moreover, when desiccation processing should be ended (S22), while heating heater 21a for desiccation is stopped like [ in case predetermined time detection of the tip of a record medium P is not carried out ] after the inhalation-of-air fan's 26 halt, a ventilating fan 25 is suspended by the controller 29 (S24), and desiccation processing is completed by it.

[0051] In addition, although what performs only open air installation into a duct 23 was shown as an inhalation-of-air fan 26 by the example mentioned above, it is not restricted to this. That is, while normal rotation actuation is possible as an inhalation-of-air fan (air-supply means) so that the open air may be introduced in a duct 23, the thing in which inversion actuation is possible may be used so that the gas in a duct 23 may be discharged outside. Thus, the procedure of the desiccation processing in the dryer part which has the inhalation-of-air fan 26 who may function also as a ventilating fan is shown in drawing 6.

[0052] In this case, it is the same as that of the example of drawing 5 that actuation of a ventilating fan 25 is started in S10. On the other hand, if a controller 29 receives the detecting signal from the tip detection sensor 27, the inhalation-of-air fan's 26 normal rotation actuation is made to start (S16A), and while the printed record medium P of one sheet passes through the inside of a duct 23 (i.e., while the printed record medium P exists between the heating roller 21 for desiccation, and the lamination section 2), thereby, the damp open air will be introduced by the inhalation-of-air fan 26 in a duct 23. Furthermore, a controller 29 makes the inhalation-of-air fan's 26 inversion actuation start, when the detecting signal from the back end detection sensor 28 is received (S20A). Thereby, the gas in a duct 23 is discharged outside by the both sides of a ventilating fan 25 and the inhalation-of-air fan 26.

[0053] Thus, it becomes possible to remove efficiently the elevated temperature of the inside of a duct 23, or the printed record-medium P circumference, and highly humid air certainly by using the inhalation-of-air fan 26



who may function also as a ventilating fan. Therefore, it can always maintain at the proper temperature and the humidity which do not have a bad influence on lamination processing of the printed record medium [ in / for a dryer part 20 / the latter lamination section 2 ] P. Moreover, heat insulation with a dryer part 20 and a peripheral device and the need for cooling of the dryer-part 20 circumference can be reduced further.

[0054] Drawing 7 is the outline block diagram showing other operation gestalten of the laminator by this invention. In addition, the same sign is given to the same element as the element explained in the above-mentioned operation gestalt, and the overlapping explanation is omitted.

[0055] In laminator 1A shown in drawing 7, the dryer part 20 is equipped with the heating plate 30 for desiccation instead of the heating roller for desiccation. The heating plate 30 for desiccation is arranged so that the front face may counter with the rear face (rear face of a print side) of the printed record medium P between the locations where medium guide 14a is arranged in the laminator 1 of drawing 1, i.e., the heating roller 21 for desiccation and the lamination section 2 in drawing 1. The heating plate 30 for desiccation contains heating heater 30a for desiccation by which a temperature control is carried out with the temperature controller which is not illustrated. Moreover, the skin temperature of the heating plate 30 for desiccation is maintained at an elevated temperature so that even extent required of good lamination processing of the printed record medium P can be dried by heating heater 30a.

[0056] Moreover, in laminator 1A, the pressurization rollers 22f and 22r for desiccation are arranged as a pressurization means for desiccation two near the inlet port of a duct 23 (dryer part 20), and near an outlet. Each pressurization rollers 22f and 22r for desiccation are energized to the heating plate 30 for desiccation by the press device which is not illustrated while a rotation drive is carried out according to an individual by the drive which is not illustrated, respectively. Thereby, in the dryer part 20 of laminator 1A, the desiccation nip 24 is formed in two places. When the printed record medium P does not exist in each desiccation nip 24, the pressurization roller 22 for desiccation contacts the heating roller 21 for desiccation, and may be heated with a roller 21.

[0057] In laminator 1A of drawing 7, from an ink jet printer etc., the printed record medium P sent to the dryer part 20 will be pressed by the heating plate 30 for desiccation, and will be rapidly heated from a rear face by 1 Motome's pressurization roller 22f for desiccation, and 2 Motome's pressurization roller 22r for desiccation. Thus, even if it uses the heating plate 30 for desiccation instead of the heating roller for desiccation, the same effectiveness as the case of the first operation gestalt can be acquired.

[0058] In this case, it is desirable when the rotational speed of pressurization roller 22r for desiccation of an outlet side is quickly set up a little rather than pressurization roller 22f [ of an entrance side / for desiccation ] rotational speed. Thereby, since the printed record medium P will be in the condition that it was pulled by pressurization roller 22r for desiccation of a dryer-part outlet side, and tension was given, it becomes possible to stick the printed record medium P on the heating plate 30 for desiccation certainly. Moreover, when the field which contacts the printed record medium P of the heating plate 30 for desiccation is formed as a convex, it is desirable. Even if it adopts such a configuration, it becomes possible to stick the printed record medium P on the heating plate 30 for desiccation certainly. In addition, the above-mentioned controller is omitted in drawing 7.

[0059] Drawing 8 is the outline block diagram showing the printing equipment by this invention. In addition, the same sign is given to the same element as the element explained in each above-mentioned operation gestalt, and the overlapping explanation is omitted.

[0060] The printing equipment 50 of drawing 8 is equivalent to what built the above-mentioned laminator 1 into the printer. That is, the printing equipment 50 equips the upstream of a laminator 1 (dryer part 20) with the cartridge 53 and the cutter style 54 the ink jet recording head 51, the conveyance roller group 52, and for record media as a print engine. In a printing equipment 50, record-medium (print form) P' currently wound around the interior of a cartridge 53 in the shape of a roll is intermittently sent out with a sufficient precision by the conveyance roller group 52. And according to this intermittent-feed rate, the ink jet recording head 51 operates at an abbreviation right angle to the conveyance direction of record-medium P', and carries out the regurgitation of the ink to the front face of record-medium P'. Thereby, an image is formed in the front face of record-medium P'. After print termination, record-medium P' is fast forwarded so that the cutter style 54 may be passed, and it is cut by the cutter style 54.

[0061] Thus, the printed record medium P obtained is sent to a dryer part 20 by the conveyance system which is not illustrated. And desiccation processing in a dryer part 20 and lamination processing in the lamination section 2 are performed to the printed record medium P by the same procedure as that the laminator 1 was explained to be. Moreover, record-medium P' which remained in the cartridge 53 side is pulled back by the



inverse rotation of the take-up motion of the conveyance roller group 52 and a cartridge 53 to a print ready position.

[0062] While a series of activities of the image formation to record-medium P', desiccation of the printed record medium P, and the lamination processing to the printed record medium P may be done in the inside of a short time according to the printing equipment 50 by such this invention, the printed record medium P suitable for the mothball which has a high-definition image can be obtained easily and certainly. Of course, in such a printing equipment 50, a dryer part 20 may be equipped with the heating plate for desiccation, and you may have the air-supply means which may function on a dryer part 20 as both sides of a ventilating fan and an inhalation-of-air fan. In addition, the above-mentioned controller is omitted in drawing 8.

[0063]

[Effect of the Invention] It is maintained at the temperature and humidity suitable for lamination processing while a printed record medium is efficiently dried by the dryer part to the inside of a short time according to this invention, as explained above. Therefore, the distance between a heating means and the lamination section can be shortened, and high-speed lamination processing can be realized, and the whole equipment can be miniaturized. Moreover, since overheating of a printed record medium and the laminate material accompanying it is also prevented, in the lamination section, a lamination layer can be certainly fixed to a printed record medium. And as mentioned above, since generating of the dew condensation in a dryer part is prevented, deterioration of the poor lamination resulting from moisture adhering to a printed record medium and image grace can be prevented effectively.

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[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the outline block diagram showing 1 operation gestalt of the laminator by this invention.

[Drawing 2] It is a mimetic diagram explaining the lamination processing in the laminator of drawing 1.

[Drawing 3] It is a fragmentary sectional view explaining the lamination processing in the laminator of drawing 1.

[Drawing 4] It is a fragmentary sectional view explaining the cleaning device prepared in the laminator of drawing 1.

[Drawing 5] It is a flow chart explaining the procedure of the desiccation processing in the laminator of drawing 1.

[Drawing 6] It is a flow chart explaining the procedure of the desiccation processing in the modification of the laminator concerning 1 operation gestalt of this invention.

[Drawing 7] It is the outline block diagram showing other operation gestalten of the laminator by this invention.

[Drawing 8] It is the outline block diagram showing the printing equipment by this invention.

**[Description of Notations]**

1 1A Laminator

2 Lamination Section

3 Heating Roller for Fixing

3a Fixing heater

4 Pressurization Roller for Fixing

5 Fixing Nip

6 Delivery Roller

7 Rolling-Up Roller

10 Refrigeration Unit

12 Paper Output Tray

14a, 14b Medium guide

15 Cleaning Device

20 Dryer Part

21 Heating Roller for Desiccation

21a The heating heater for desiccation

22, 22f, 22r Pressurization roller for desiccation

23 Duct

24 Desiccation Nip

25 Ventilating Fan

26 Inhalation-of-Air Fan

27 Tip Detection Sensor

28 Back End Detection Sensor

29 Controller

29 Controller

30 Heating Plate for Desiccation

30a The heating heater for desiccation

50 Printing Equipment

51 Ink Jet Recording Head

L Lamination layer

P A printed record medium

S Imprint sheet

S1 Base material

S2 Adhesive layer

S3 Surface

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[Translation done.]



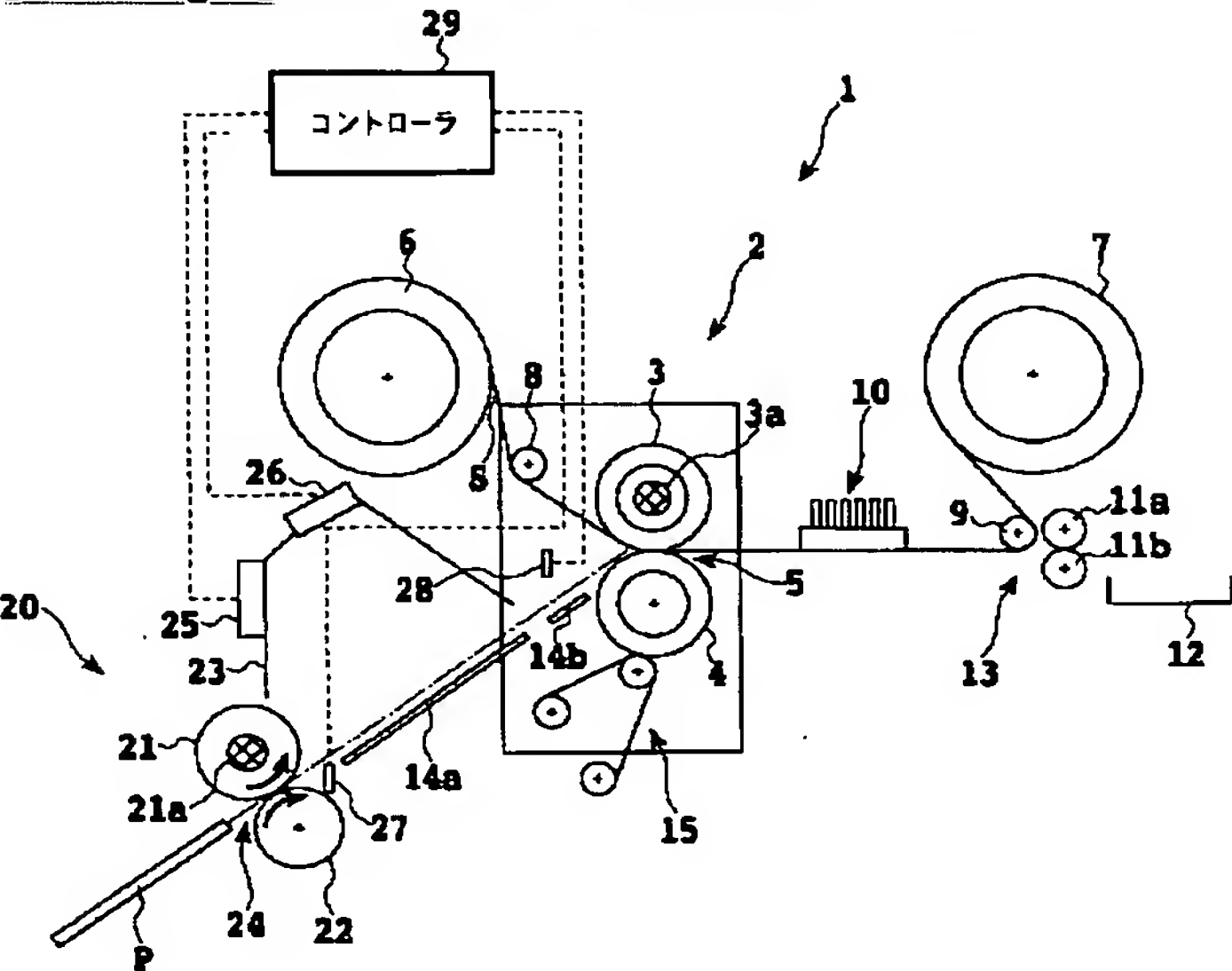
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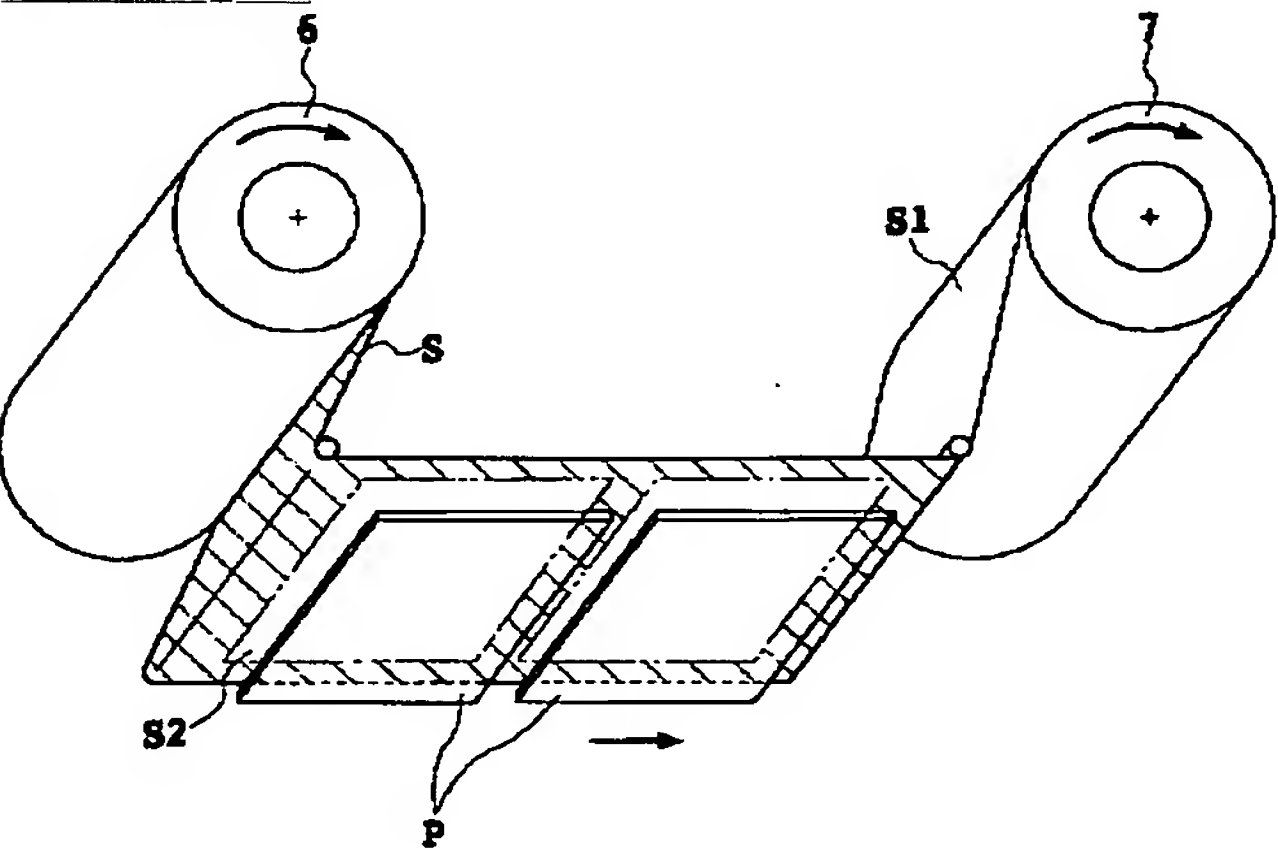
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DRAWINGS

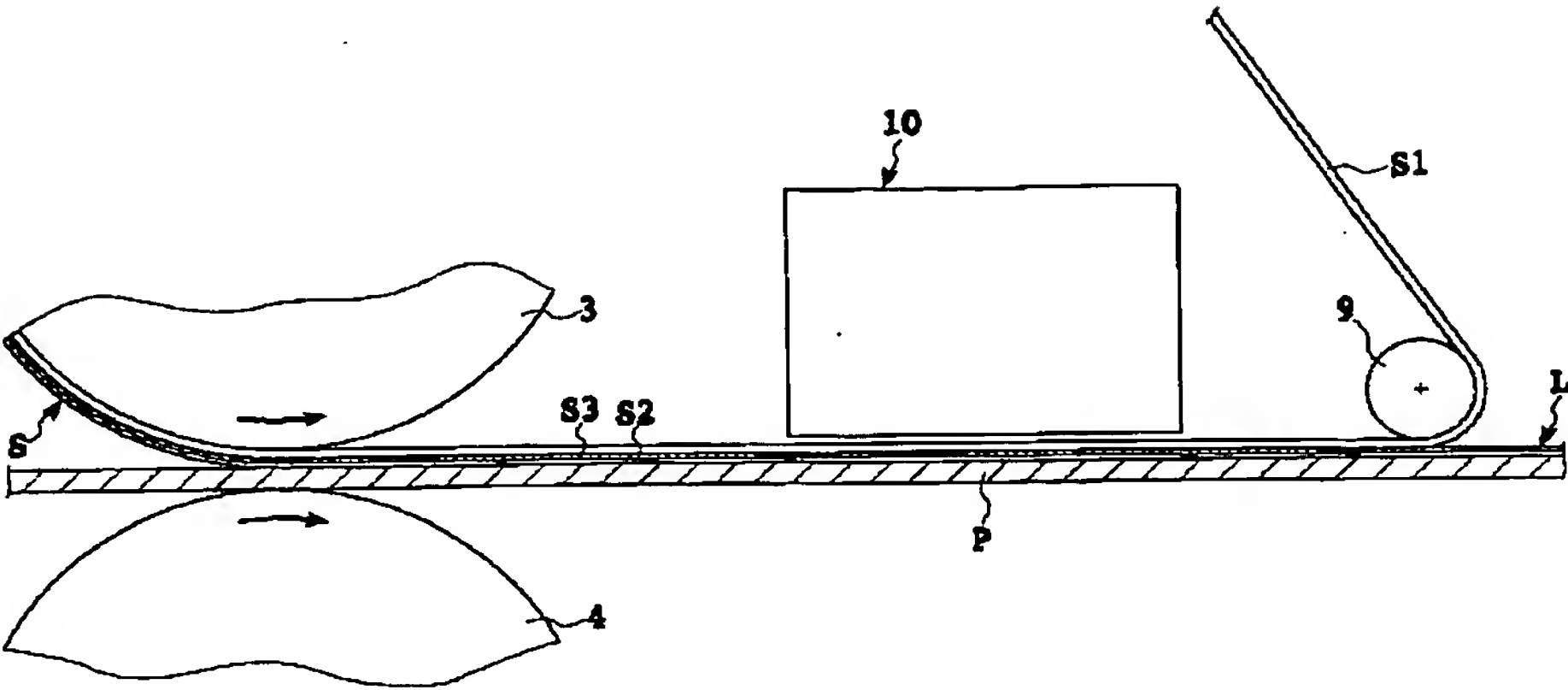
[Drawing 1]



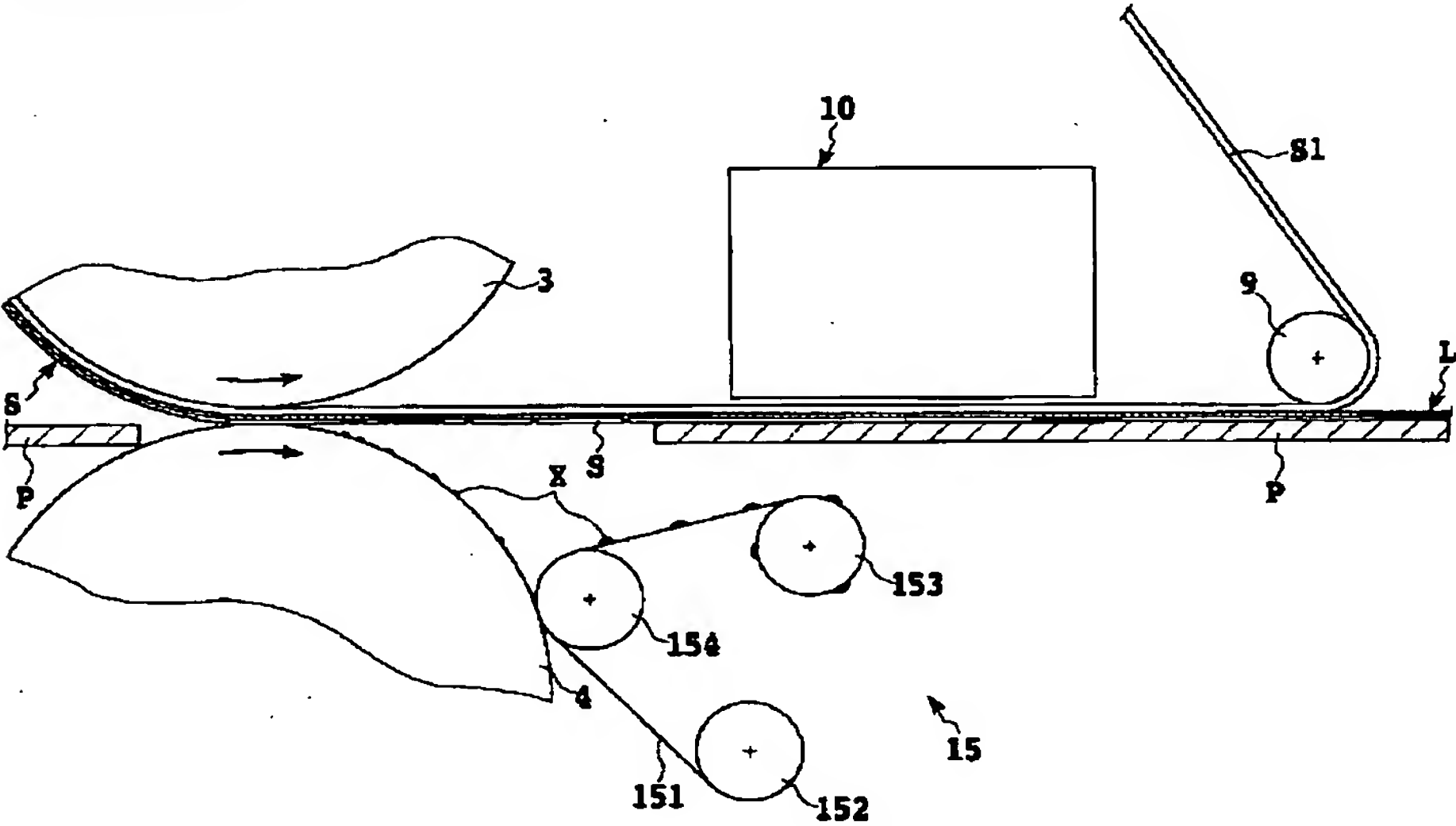
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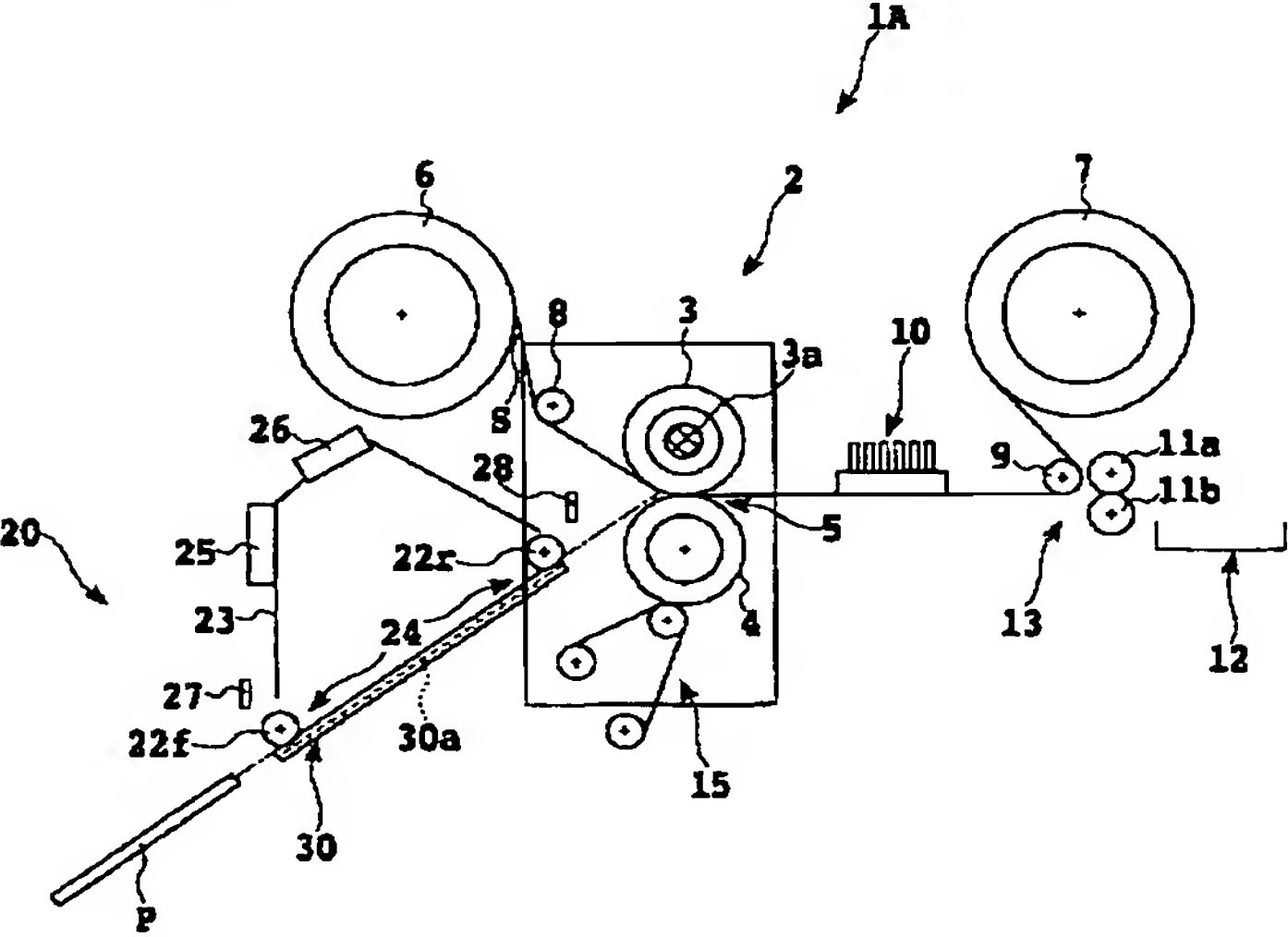
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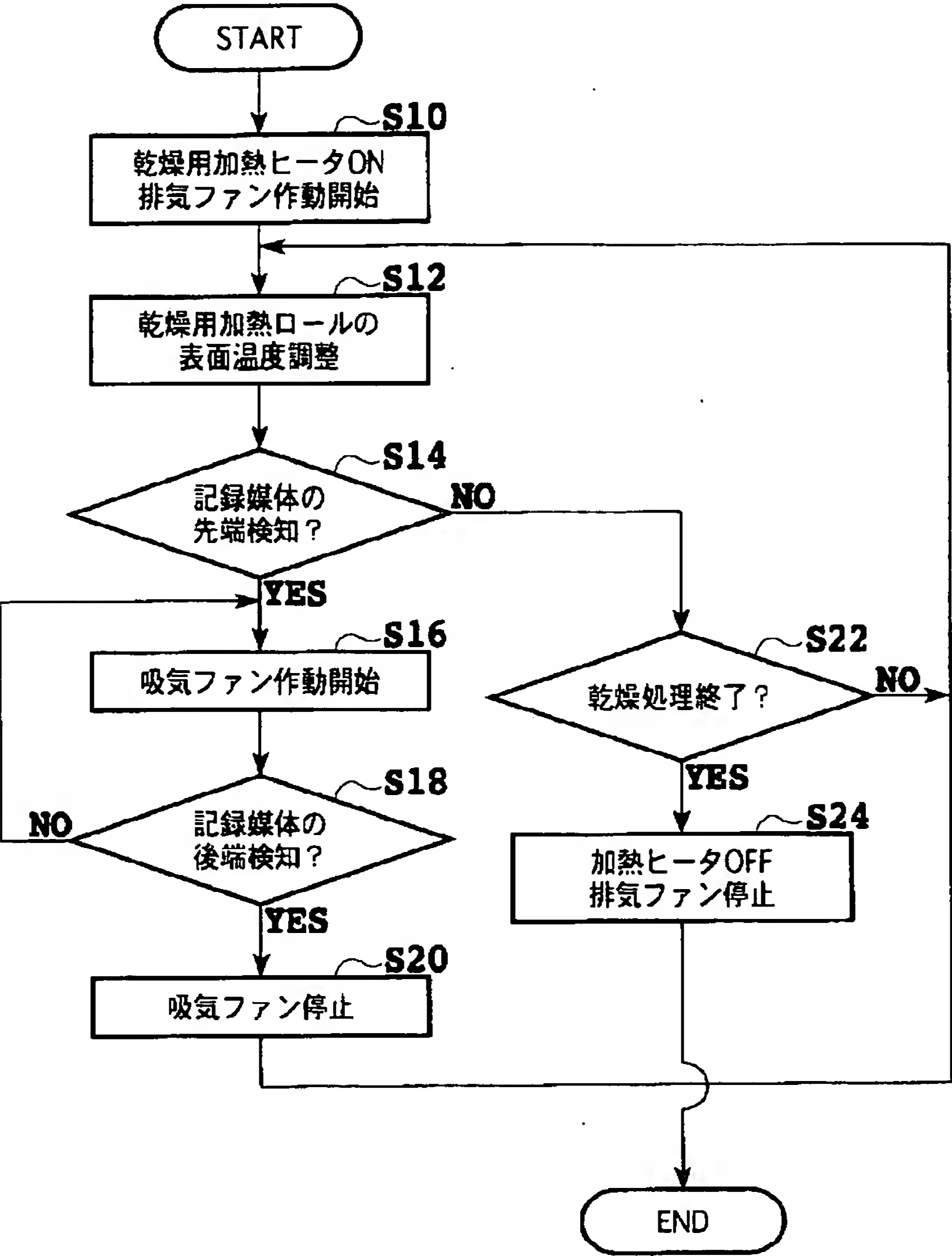
[Drawing 4]



[Drawing 7]

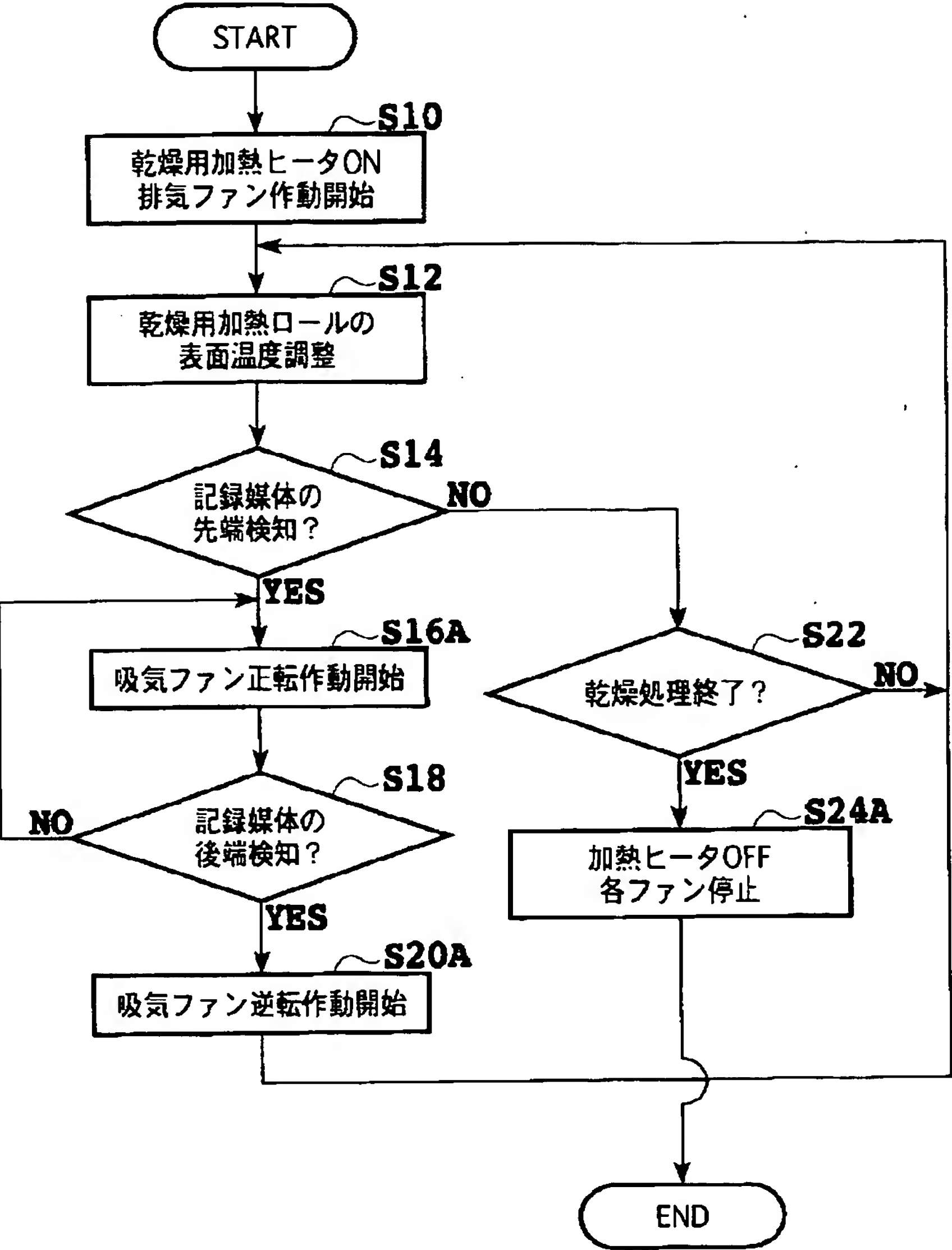


[Drawing 5]

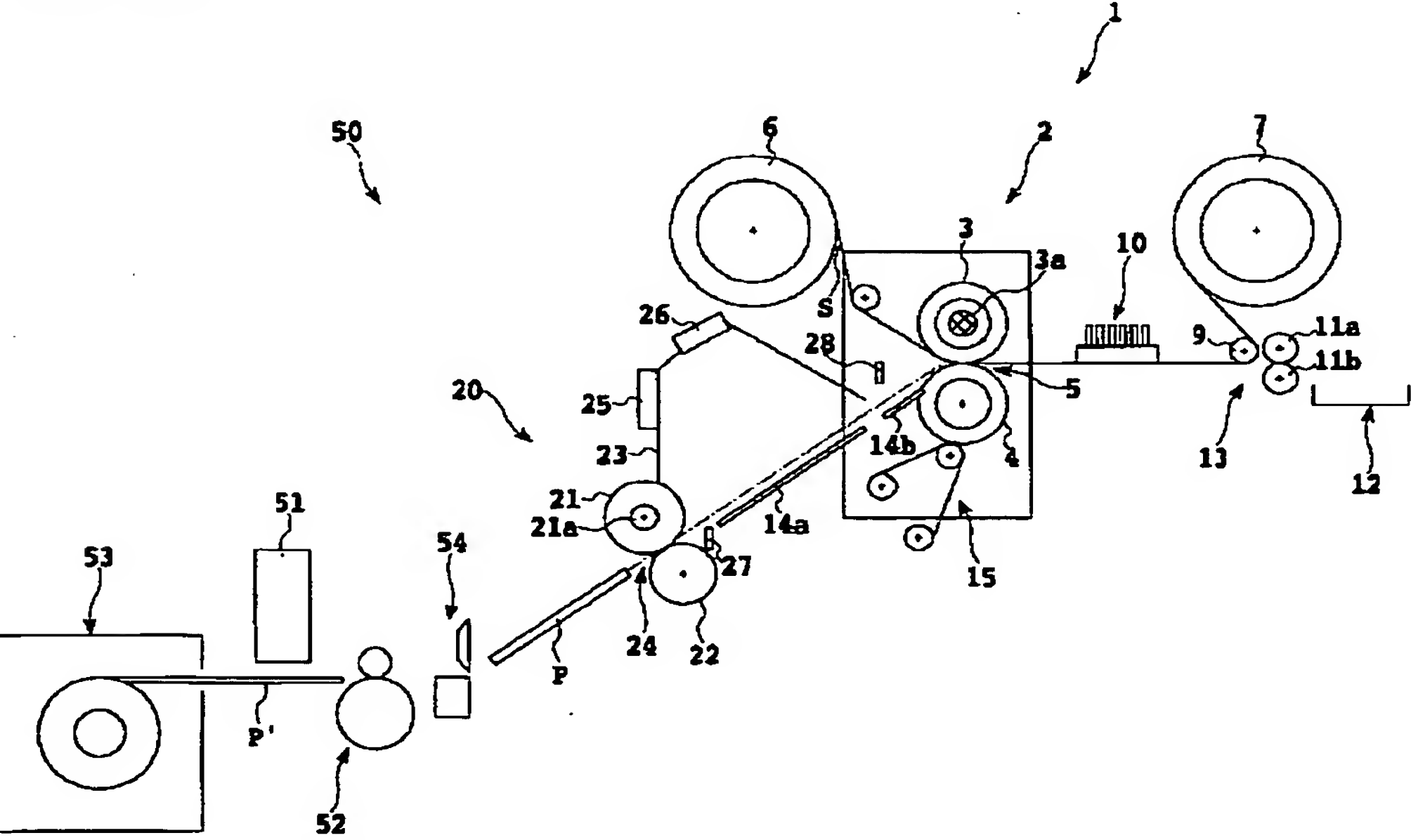


[Drawing 6]





[Drawing 8]



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[Translation done.]